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The full descriptions, detailed lists of stations, and numerous text cuts leave nothing to be desired in the way of information.

MAXON[15] has described 6 new species of *Selaginella* from southern California, New Mexico, Arizona, and Glacier National Park.

WILDEMAN[16] has published another fascicle of additions to the flora of the Congo, illustrating the abundance of material that continues to be discovered in that interesting territory. A full list of collectors and stations is given, and frequently also full descriptions based upon fresh material. There is also included an account of *Meliola* as represented in the Congo country, with descriptions of new species and varieties, and *Meliolinopsis* is established as a new genus.

ROBINSON,[17] in connection with his study of the Bolivian representatives of *Eupatorium*, has described certain novelties of the tribe. New species are described in *Micania* (19), *Eupatorium* (6), *Ageratum*, and *Alomia*, while *Sphaereupatorium* is established as a new genus and credited to KUNTZE. In the Eupatoriums of Bolivia, 68 species are recognized, 29 of which are endemic. In this connection the following statement is made: "The endemism of Bolivia as illustrated by this group is thus about 43 per cent as against about 55 per cent in Peru and 59 per cent in Colombia. After deducting the 29 endemic species, there remain 39 Bolivian Eupatoriums which extend to other countries. Of these only 18 are known in Peru, while nearly all the others are species common to south-central Brazil and northern Argentina. Beyond a very few species of wide distribution there is a surprisingly slight common element between the Bolivian and Paraguayan members of the genus, although *Eupatorium* is pretty well represented in both of these contiguous countries." —J. M. C.

Reproduction of Douglas fir forests.—The great importance of the Douglas fir forest region may be appreciated from the estimate by MUNGER[18] that the stand within Washington and Oregon amounts to 560 billion feet of merchantable timber, while the amount in the adjacent forests of British Columbia according to WHITFORD[19] is not less than 350 billion feet. It seems certain that the amount destroyed by comparatively recent fires is almost if not quite equal to that now standing. The character and extent of the destruction are indicated by MUNGER, and have been given in more detail by HOFMANN[20] in a most interesting article. A great burn occurring in 1902 in south-central Washington, and devastating more than half a million acres, was made the site of an important investigation of some of the problems of natural reforestation. The resulting report[21] shows the importance of a careful ecological study of all the factors concerned. In spite of the complete and apparently hopeless desolation succeeding this fire, typical of hundreds of similar conflagrations in the Douglas fir region, HOFMANN found that a good even-aged stand of reproduction immediately followed. This extended over the greater portion of the devastated area, regardless of the presence or absence of surviving seed trees, and was shown to be due to an abundance of seed stored in the duff of the forest floor and retaining its viability through the fire. The efficiency of seed trees in restocking the ground was found to be limited to a radius not exceeding 300 feet from the parent tree, hence they were not important in the reforestation of so large an area. Local failure in reforestation within this area was found to be due either to the complete destruction of all the duff, with its contained seed, over certain portions of the area and more particularly upon the drier southern slopes, or to the occurrence of a second fire after all the viable stored seed had germinated. This resulted in the destruction of all the seedlings before they were old enough to bear seed to restock the forest floor. The burial of seeds and cones by rodents was found to be an important factor in stocking the duff.

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[15] MAXON, W. R., New Selaginellas from the western United States. Smithson. Miscell. Coll. **72**: no. 5. pp. 10. *pls. 6.* 1920.

[16] WILDEMAN, E. DE, Additions à la flore du Congo. Bull. Jard. Bot. Bruxelles **7**:1–160. 1920.

[17] ROBINSON, B. L., I. Further diagnoses and notes on tropical American Eupatorieae. II. The Eupatoriums of Bolivia. Contrib. Gray Herb. New Series. no. 61. pp. 80. 1920.

[18] MUNGER, T. T., Forestry in the Douglas fir region. Amer. Forestry **26**:199–205. *figs. 7.* 1920.

[19] WHITFORD, H. N., and CRAIG, R. D., Forests of British Columbia. pp. 409. *pls. 28. maps 21.* Commission of Conservation, Canada. Ottawa. 1918.

More recent investigations by HOFMANN[22] of the ecology of these forests show the *Pseudotsuga* to be unable to withstand shade, and hence to constitute the principal member of a pioneer forest of which *Thuja* and *Tsuga* form the climax. The characteristics of the Douglas fir which give it such a prominent place in the Washington and British Columbia region are given as follows: "The production of heavy crops of seed which is the favorite food of the indigenous rodents; caching of seed by rodents in the forest floor; ability of the seed to retain its viability while stored in the forest floor and to live through forest fires; early and quick germination of the seed under favorable conditions; and a rapid development of a long radicle."

Many of these factors are somewhat within the control of man, and upon them the scientific management of Douglas fir forests must be based. Such a system has been described by MUNGER (*loc. cit.*) and in its bare outline consists in: (1) logging clean, (2) falling dead trees or "snags," which are a fire menace, (3) burning the slash broadcast the first spring or fall after logging, and (4) keeping subsequent fires out of all areas once burned. These constitute the methods now followed within the national forests of Washington and Oregon to secure the reforestation of lumbered areas.—GEO. D. FULLER.

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[20] HOFMANN, J. V., How fires destroy our forests. Amer. Forestry **26**:329–336. *figs.* 7. 1920.

[21] ———, Natural reproduction from seed stored in the forest floor. Jour. Agric. Res. **11**:1–26. *pls.* 7. 1917.

[22] ———, The establishment of a Douglas fir forest. Ecology **1**:49–53. *fig.* 1. 1920.

Plants of acid soils.—A method of determining the acidity or alkalinity of soils according to the hydrogen-ion concentration, and adapted to use in the field, has been developed by WHERRY.[23] He has also used the method in determining the character of the soil in which certain "oxylophytes" are usually found growing.[24] Based upon the reaction of the soil solution, the soils were classified for the purpose of this study as "superacid," "mediacid," "subacid," and "minimacid," containing respectively more than 1000 times the acid of pure water, 100 to 1000 times, 10 to 100 times, and up to 10 times, with a similar evaluation of the alkaline soils. It is then pointed out that oxylophytes may be regarded as plants of mediacid soils and calcicoles of neutral or minimalkaline soils. Tables based upon soil tests show that among the heath plants of New England, those of the Pyroloideae are most characteristic of subacid soils, while the Ericoideae and Vaccinoideae most usually reach best development upon mediacid soils, many upon subacid and minimacid soils, and a few upon neutral soils. A further list of plants upon mediacid soils includes such species as *Aspidium spinulosum*, *Lycopodium Selago*, *Clintonia borealis*, *Coptis trifolia*, *Cornus canadensis*, and *Linnaea borealis*. Another list is compiled of plants upon circumneutral soils.

Similar methods applied to the study of certain coastal areas also give most interesting results.[25] A strip of land between the pine barrens and the salt marshes of New Jersey and populated by plants characteristic of the upland woods of the northern part of the state showed a specific acidity of 10 or less, so that the soil may be classified as circumneutral. On closely associated areas are found plants which grow elsewhere in southern New Jersey only in the sand barrens. These soils, in spite of their proximity to the salt marsh, showed a specific acidity of 300, or practically the same as that of the pine barren sands themselves. The border of some salt marshes on the Massachusetts coast showed plant associations usually found inland on peat or wet sand, and again tests proved the soil to be strongly acid. The explanation of these strongly acid soils bordering the alkaline salt marsh areas is that from the sea water drawn by capillarity into the soil the bases

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[23] WHERRY, EDGAR T., Determining soil acidity and alkalinity by indicators in the field. Jour. Wash. Acad. Sci. **10**:217–223. 1920.

———, Soil acidity and a field method of its measurement. Ecology **1**:160–173. *pl. 1.* 1920.

[24] ———, Soil tests of Ericaceae and other reaction-sensitive families in northern Vermont and New Hampshire. Rhodora **22**:33–49. 1920.

[25] ———, Plant distribution around salt marshes in relation to soil acidity. Ecology **1**:42–48. 1920.